International Civil Aviation Organization

REGIONAL WORKSHOP ON AMHS

System Level Provisions

(Dakar, 28-29 May 2013)

Outline

- ATSMHS users
- AMHS model
- Organization of the AMHS
- AMHS management domain
- Naming and addressing
- AMHS routing and re-routing
- AMHS traffic logging upon origination

ATSMHS Users

- Direct AMHS users shall use either the basic ATSMHS or the extended ATSMHS at an ATS message user agent.
- Indirect AMHS users shall use only that part of the ATSMHS which corresponds to AFTN functionalities by using the interworking capability provided by an AFTN/AMHS gateway.

AMHS Functional Model

Components

- The systems comprising the AMHS shall themselves be comprised of the following functional objects, the general role of which is described in ISO/IEC 10021-2 and ISO/IEC 9594-2:
  - a) message transfer agent(s) (MTA);
  - b) user agent(s) (UA);
  - c) message store(s) (MS);
  - d) access unit(s) (AU); and
  - e) directory user agent(s) (DUA).
- Notes
  - The ISO/IEC 10021 elements of service and protocols used by these functional objects are specified in Chapters 3 and 4.
  - The ISO/IEC 9594 services and protocols used by these functional objects are specified in Part IV.
  - The DUA is an intrinsic part of the extended ATSMHS. However, they also belong to the ATN directory as specified in Part IV.

AMHS Functional Model

ATS Message Server

- An ATS message server shall include an MTA and optionally one or several MS, as specified in 3.2.2 to 3.2.4. For the support of the extended ATSMHS, an ATS message server shall include a DUA as specified in 3.2.5.

ATS Message User Agent

- An ATS message user agent shall include a UA as specified in 3.1.2 to 3.1.4. For the support of the extended ATSMHS, an ATS message user agent shall include a DUA as specified in 3.1.5.

AFTN/AMHS Gateway

- An AFTN/AMHS gateway shall include an MTA, which is part of the ATN component of the AFTN/AMHS gateway, and an AU, as specified in Chapter 4. The AU is the message transfer and control unit of the AFTN/AMHS gateway. For the support of the extended ATSMHS, an AFTN/AMHS gateway shall include a DUA as specified in 4.2.7.

AMHS information model

- The following three categories of AMHS information objects shall be used:
  - a) messages;
  - b) probes; and
  - c) reports.
- ***Messages.*** *In the basic ATSMHS, each AMHS message shall correspond unequivocally to an ATS* message.
  - *Note.— The provisions in Chapters 3 and 4 concerning ISO/IEC 10021 envelopes apply to transfer envelopes only.*
- ***Probes.*** *Only direct AMHS users shall be able to submit AMHS probes.*
- ***Reports.*** *AMHS reports shall be delivered only to direct AMHS users.*

Security Model

In the basic ATSMHS

- security should be obtained by procedural means rather than by technical features inherent to the AMHS. In the basic ATSMHS, the security for each AMHS System is deemed a local issue to be addressed by the authority in charge of the system.

In the extended ATSMHS

- a general AMHS security policy shall be implemented from ATS message user agent to ATS message user agent and provide the following security services:
  - a) message origin authentication;
  - b) content integrity; and
  - c) message sequence integrity.

Security Model

- The general AMHS security policy
  - aims to protect ATS message exchanges against the identified threats which are masquerade, modification and replay.
  - is aligned with the general ATN security framework as defined in Part IV.
  - is a common minimum which does not prevent specific communities of AMHS users from implementing more stringent security policies in case of additional user requirements.
- The use of AMHS security services shall apply to:
  - a) communications between direct AMHS users supporting the extended ATSMHS; and
  - b) communications from direct AMHS users to AFTN/AMHS gateways supporting the extended ATSMHS.
- The use of an asymmetric algorithm makes it possible to use security with indirect AMHS users in the direction from AMHS to AFTN only. Asymmetric signature mechanisms cannot be originated at an intermediate device such as a gateway.
- The AMHS security policy shall make use of the ECDSA as specified in Part IV.

Management Model

In the extended ATSMHS

- the AMHS management shall include:
  - a) logging provisions which are defined for the ATS message user agent, the ATS message server and the AFTN/AMHS gateway; and
  - b) storage of management information about ATS message servers and AFTN/AMHS gateways in the ATN XMIB, as specified in Part IV.

In the basic ATSMHS

- management is limited to the logging provisions which are defined for the ATS message user agent, the ATS message server and the AFTN/AMHS gateway.
- Retrieval or exchange of this information, is deemed a local issue to be addressed by the authority in charge of the system.

Organization of the AMHS

- The AMHS shall be organizationally composed of AMHS management domains.
- An AMHS management domain may elect to operate as either an ADMD or a PRMD, depending on the national telecommunications regulation in force in the State(s) in which it operates and on its relationships with other management domains.
- A PRMD which is subordinate to one or several AMHS ADMDs may qualify as AMHS management domain if it satisfies the provisions of this manual.

AMHS Management Domain Configurations

Minimum set of systems

- The minimum set of systems implemented and operated by an AMHS management domain shall be:
  - a) an ATS message server and one or several ATS message user agents;
  - b) an AFTN/AMHS gateway; or
  - c) any combination of a) and b).

Interconnection between two AMHS management domains

- An interconnection between two AMHS management domains shall be implemented as a connection between:
  - a) two ATS message servers;
  - b) an ATS message server and an AFTN/AMHS gateway; or
  - c) two AFTN/AMHS gateways.

AMHS Management Domain Configurations

AMHS management

- For the purpose of AMHS management, ATN cross-domain management as considered in Part IV shall apply between AMHS management domains.
- Only AMHS systems which support interconnection between AMHS management domains as listed in 2.4.2 shall be subject to ATN cross-domain management.
- The way in which management information is exchanged between the managed AMHS systems and the ATN XMIB is a matter of policy local to an AMHS management domain.

Naming and Addressing Principles

AMHS O/R names

- For the support of the basic ATSMHS, the O/R name of an AMHS user shall comprise:
  - a) the O/R address of the AMHS user (called an MF-address); and
  - b) optionally the directory name of the AMHS user, if the policy of the AMHS management domain, to which the AMHS user belongs, includes the local support of directory-names.
- As a matter of policy local to an AMHS management domain, the directory name component of an O/R name may be used by the implementation of the optional DIR FG.
- For the support of the extended ATSMHS, the O/R name of an AMHS user shall comprise:
  - a) the O/R address of the AMHS user (called an MF-address); and
  - b) the directory name of the AMHS user.

Naming and Addressing Principles

Structure of an MF-address

- The MF-address (MHS-form address) of an AMHS user shall comprise:
  - a) a set of attributes, as specified in 2.5.1.3, identifying the AMHS management domain of which the AMHS user, either direct or indirect, is a service user; and
  - b) a set of attributes, as specified in 2.5.1.4, uniquely identifying the AMHS user within the AMHS management domain. The attributes may include any standard or domain-defined attribute among those specified in ISO/IEC 10021-2, Section 18 other than *country-name, administration-domain-name* and *private-domain-name.*

Naming and Addressing Principles

AMHS management domain identifier

- The attributes identifying an AMHS management domain shall include the following standard attributes as specified in ISO/IEC 10021-2, Section 18.3:
  - a) *country-name, taking the value "XX" as authorized by ITU-T to ICAO under the regime of* Recommendation X.666 for international registered organizations,
  - b) *administration-domain-name, taking the value "ICAO" as registered by ITU-T for ICAO under the same* regime,
  - c) *private-domain-name.*
- An AMHS management domain identifier shall be unique and declared to ICAO for insertion in the ICAO Register of AMHS Management Domains, by the State or organization in which the management domain operates.

Naming and Addressing Principles

- The ICAO Register of AMHS Management Domains shall include at least one record, for each ICAO State, composed of the following attribute-values to be used in case no other AMHS management domain identifier has been declared by the State:
  - a) *country-name, taking the value "XX",*
  - b) *administration-domain-name, taking the value "ICAO", and*
  - c) *private-domain-name, taking one of the following values:*
    - 1) the one or two nationality letters specified in Index to Nationality Letters for Location Indicators in Doc 7910 — *Location Indicators if there is a one-to-one relationship between the nationality* letters and the State;
    - 2) one of the pairs of nationality letters as specified in the Index in Doc 7910, uniquely allocated by the Secretariat if there are several pairs of nationality letters allocated to the State; or
    - 3) an ICAO designator composed of two to four letters, comprising the nationality letters and zero to two additional letters allocated by Secretariat to create a unique identifier.

Naming and Addressing Principles

- P*rivate-domain-name values corresponding to nationality letters* specified in Doc 7910 may be reserved for use, if desired.
- The declaration of an AMHS management domain identifier shall:
  - a) take precedence over the attribute-values specified in 2.5.1.3.3 provided that it does not contradict 2.5.1.3.4,
  - b) cause overriding of the attribute-values specified in 2.5.1.3.3 by the declared attribute-values in the ICAO Register of AMHS Management Domains.

Naming and Addressing Principles

MF-addressing schemes - General provisions

- It is a matter of policy local to an AMHS management domain to implement either an MF-addressing scheme, a locally defined AMHS addressing scheme or a combination of these. The two MF-addressing schemes defined in this manual are the common AMHS addressing scheme and the XF-addressing scheme. Additional Mfaddressing schemes may be defined in the future.
- Aeronautical industry X.400 addressing schemes are defined in appropriate aeronautical industry standards.
- Each AMHS addressing scheme includes the set of attributes identifying the AMHS management domain as specified in 2.5.1.3.3.
- An AMHS management domain should implement the common AMHS addressing scheme at the earliest opportunity to allocate MF-addresses to AMHS users within its domain of responsibility.

Naming and Addressing Principles

- An AMHS management domain should avoid deviating from the common AMHS addressing scheme and refrain from implementing a locally defined AMHS addressing scheme unless specific unavoidable constraints (e.g. regulatory) apply to the AMHS management domain.
- When an ICAO contracting State has not declared its use of the common AMHS addressing scheme, nor of a locally defined AMHS addressing scheme, then use of the XF-addressing scheme shall be assumed for indirect and direct AMHS users in this State.

Naming and Addressing Principles

MF-addressing schemes - XF-addressing scheme

- An XF-address (translated-form address) is a particular MF-address of which the attributes identifying the user within an AMHS management domain (i.e. those attributes other than country-name, administration-domain-name and private-domain-name) may be converted by an algorithmic method to and from an AF-address (AFTN-form address).
- The algorithmic method requires the additional use of look-up tables which are limited, i.e. which include only a list of AMHS management domains rather than a list of individual users, to determine the full MF-address of the user.'
- No distinction is made between upper case and lower case in an XF-address.

Naming and Addressing Principles

- The XF-address of a direct or indirect AMHS user shall be composed exclusively of:
- a) an AMHS management domain identifier as specified in 2.5.1.3.3, composed of the attribute-values found for the State or organization of the user in the ICAO Register of AMHS Management Domains, using one of the following character combinations extracted from the user's AF-address, with an increasing order of preference from 1) to 4) in the case of multiple matches:
  - 1) two-letters identifying a State as specified in Doc 7910 (characters 1 and 2 of the AF-address);
  - 2) four-letters identifying a location as specified in Doc 7910 (characters 1 to 4 of the AF-address);
  - 3) a combination of either 1) or 2) above and a three-letter designator specified in *Designators for Aircraft Operating Agencies, Aeronautical Authorities and Services (Doc 8585) identifying an* organization within a State or at a location.

Naming and Addressing Principles

- b) an *organization-name attribute:*
  - 1) as specified in ISO/IEC 10021-2, Section 18.3,
  - 2) taking the four-character value “AFTN”, and
  - 3) encoded as a printable string; and
- c) an *organizational-unit-names attribute:*
  - 1) as specified in ISO/IEC 10021-2, Section 18.3,
  - 2) comprising a sequence of one single element, which takes the 8-character alphabetical value of the AF-address (AFTN-form address) of the user, and
  - 3) encoded as a printable string.

Naming and Addressing Principles

MF-addressing schemes - Common AMHS addressing scheme

The MF-address of a direct or indirect AMHS user complying with the common AMHS addressing scheme shall be composed exclusively of:

- a) an AMHS management domain identifier as specified in 2.5.1.3.3, composed of the attribute-values found for the State or organization of the user in the ICAO Register of AMHS Management Domains, using the following character combinations extracted from the user's AF-address, with an increasing order of preference from 1) to 4) in case of multiple matches:
  - 1) two-letters identifying a State as specified in Doc 7910 (characters 1 and 2 of the AF-address);
  - 2) four-letters identifying a location as specified in Doc 7910 (characters 1 to 4 of the AF-address);
  - 3) a combination of either 1) or 2) above and a three-letter designator specified in *Designators for Aircraft Operating Agencies, Aeronautical Authorities and Services (Doc 8585) identifying an* organization within a State or at a location;
- b) an organization-name attribute specified in ISO/IEC 10021-2, Section 18.3 taking a value representing a geographical unit;

Naming and Addressing Principles

- c) an *organizational-unit-names attribute specified in ISO/IEC 10021-2, Section 18.3 comprising a* sequence of a single element which takes the four-character alphabetical value of the location indicator included in the AF-address of the user; and
- d) a *common-name attribute specified in ISO/IEC 10021-2, Section 18.3 which takes the eight-character* alphabetical value of the AF-address of the user.
- No distinction is made between upper case and lower case.
- The *organization-name attribute-values selected by an AMHS management domain shall be supplied to* ICAO for publication in the ICAO Register of AMHS Management Domains, along with the ICAO location indicators included in the geographical unit represented by each *organization-name attribute value.*

AMHS naming schemes

- For the support of the extended ATSMHS, the directory name of an AMHS user shall comply with the provisions of Part IV.

Naming and Addressing Principles

Upper layer naming and addressing

Application process titles

- The application process title of an ATS message server should be as specified in Part III.
- The application process title of an AFTN/AMHS gateway should be as specified Part III.
- The application process title of an ATS message user agent should be as specified in Chapter 4 of Part III.

Application entity qualifiers

- The application entity qualifier of an ATS message server should be “AMS” (integer value 7).
- The application entity qualifier of an AFTN/AMHS gateway should be “GWB” (integer value 8).
- The application entity qualifier of an ATS message user agent should be “AUA” (integer value 9).

Naming and Addressing Principles

Transport, session and presentation addresses

- The TSAP of an ATS message server or of an ATS message user agent shall comply with the provisions of Part III.
- The assignment of a transport selector value is a matter of policy local to an AMHS management domain.
- The format and encoding of a session selector in the AMHS is specified in ISO/IEC ISP 11188-1, Section 9.3.
- The assignment and administration of session selectors is a matter of policy local to an AMHS management domain.
- The format and encoding of a presentation selector in the AMHS is specified in ISO/IEC ISP 11188-1, Section 7.2.
- The assignment and administration of presentation selectors is a matter of policy local to an AMHS management domain.

AMHS Routing and re-Reouting

- The definition of AMHS routing shall be subject to multilateral agreement.
- The MTA implemented by an AMHS management domain shall be collectively able to route on:
  - *countryname,*
  - *ADMD-name,*
  - *PRMD-name,*
  - *organization-name;*
  - *and organizational-units-name attributes.*

AMHS Traffic Logging Upon Origination

- An AMHS management domain shall be responsible for long-term logging of all messages in their entirety which are originated by its direct AMHS users for a period of at least thirty days.
- This requirement implies the logging of the entire BER-encoded ASN.1 messages.

Questions?

Thank you